

CHAPTER 6

DATA MANAGEMENT-MANUAL PAVER SYSTEM

6-1. Introduction

Chapters 2 through 5 discussed the data collection and analysis procedures which constitute the pavement management system. To use this system, it is necessary to store data in a usable manner; this data storage can be achieved by using either a computer system or a manual record keeping system. If a manual system is used, initial data storage is usually small and handled easily. The more the management system is used, the more data that must be collected and stored. Thus, the manual data storage system described in this chapter has been designed so conversion to a computer data storage system will not be complex or time-consuming.

6-2. Manual system description

Forms are used to store collected data in the manual PAVER system. Nine forms each containing pertinent information on the pavement network have been designed to store data. Three forms refer to the pavement branches; the remaining six refer to sections within each branch. Each of the forms is listed below and its use is described in the pages following. Blank reproducible forms are provided in appendix E.

- a. DA Form 5149-R, Branch Identification Summary (fig E-5).
- b. DA Form 5149-1-R, Branch Identification Summary Continuation Sheet (fig E-6).
- c. DA Form 5150-R, Section Identification Record (fig E-7).
- d. DA Form 5151-R, Section Pavement Structure Record (fig E-8).
- e. DA Form 5152-R, Section Materials Properties Record (fig E-9).
- f. DA Form 5153-R, Section Traffic Record (fig E-10).
- g. DA Form 5154-R, Section Condition Record (fig E-11).
- h. DA Form 5155-R, Branch Maintenance and Repair Requirements (fig E-12).
- i. DA Form 5156-R, Section Maintenance and Repair Record (fig E-13).

6-3. Use of the manual data forms

a. *DA Form 5149-R, Branch Identification Summary.* This form lists all branches in the pavement network, thereby providing an inventory of all network branches and sections. A completed form is shown as an example in figure 6-1. The heading has been completed to show the installation code, name, and location. The initial date is shown (space is provided for updates). The total number of branches in the network is shown. The next section of the form has been marked to record each branch of the network: the branch code, name, use, number of sections, and branch area in square yards. The list of branches can be arranged alphabetically, by quadrants of the installation, or in any other orderly fashion.

b. *DA Form 5149-1-R, Branch Identification Summary Continuation Sheet.* This form provides space to list branch code, branch name, branch use, number of sections, and branch area. Since all installations would have more branches than could be listed on the DA Form 5149-R, the continuation form would be used to complete the total number of branches in the network at all installations using the manual PAVER system.

c. *DA Form 5150-R, Section Identification Record.*

(1) This form provides space for identifying each pavement section and its use. One form should be used for each section in the pavement network. A completed form is shown as an example in figure 6-2. The heading has been completed to show the installation name, date, branch name, section area, number of sample units, and section number. The next section of the form has been marked to show the section belongs to real property, not family housing. The use is vehicular, it is a primary road with curbs, gutters, and sidewalks, and it has an asphalt surface. A sketch of the area is provided in the final section of the form. This sketch should contain at least the following:

(a) Section length dimension, width, or other measurements needed to calculate irregularly shaped areas.

(b) Section limits clearly defined to indicate intersections with other branches of sections.

BRANCH IDENTIFICATION SUMMARY

For use of this form, see TM 5-623; the proponent agency is USACE.

PAGE 1 of 1

Installation			Date			Up Dates			3.			Total No. of Branches
Code	Name	Location	Mo.	Da.	Yr.	1.			4.			
99999	FORT Z	HOME IL	10	1	79	2.			5.			3

Branch Code					Branch Name	Branch Use	Number of Sections	Branch Area Sq. Yd.
I	4	7	3	5	MARSHALL AVE	ROADWAY	5	1388
I	2	9	4	6	PLATOON ST	ROADWAY	3	735
P	0	3	2	1	PARKING BLDG 321	PARKING (CARS)	1	700

Remarks:

DA FORM 5149-R, NOV 82

Figure 6-1. An example of a completed DA Form 5149-R, Branch Identification Summary.

SECTION IDENTIFICATION RECORD

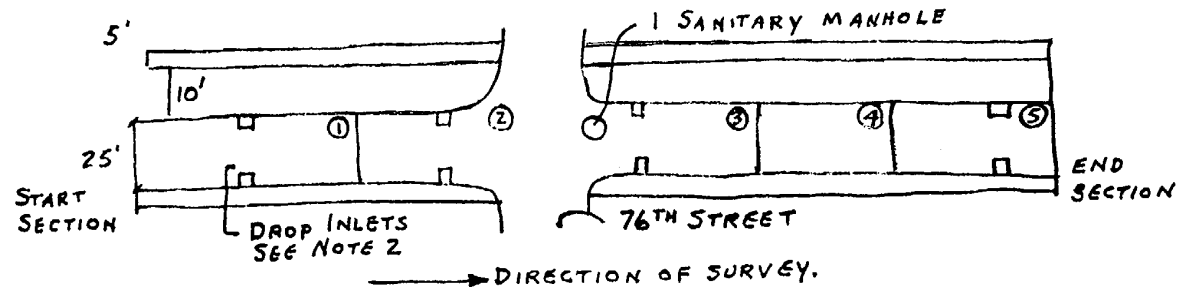
For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Area	No. of Sample Units	Section No.
FORT Z	10 2 79	MARSHALL AVE	25 ft. x 500 ft. 1388 sq. yd.	5	1

Traffic Types And Uses				General Information		
<input type="radio"/> Aircraft <input type="radio"/> Fixed Wing <input type="radio"/> Rotary Wing	<input type="radio"/> Runway <input type="radio"/> Taxiway <input type="radio"/> Parking or Pads <input type="radio"/> Apron <input type="radio"/> Other	<input checked="" type="radio"/> Vehicular <input checked="" type="radio"/> Real Property <input type="radio"/> Family Housing	<input checked="" type="radio"/> Primary <input type="radio"/> Secondary <input type="radio"/> Tertiary <input type="radio"/> Parking - Storage <input type="radio"/> Other	Curb And Gutter <input checked="" type="radio"/> Left <input checked="" type="radio"/> Right <input type="radio"/> None	Sidewalks <input checked="" type="radio"/> Left ____ ft. <input checked="" type="radio"/> Right ____ ft. <input type="radio"/> None ____	Surface Type <input type="radio"/> PCC <input checked="" type="radio"/> AC <input type="radio"/> Surface Treatment <input type="radio"/> Other

Sketch:

On sketch: note any subsurface drainage (type, location) and, secondary structures, such as, manholes, water shut-offs, etc.



NOTES:

1. 5 SAMPLE UNITS @ 100' MARSHALL STREET STRUCTURE CARRIES THROUGH THE INTERSECTION.

2. CURB DROP INLETS-4 LOCATED IN SECTION. MAINLINE IS ON SOUTH SIDE OF PVMT CROSS OVER PIPE FROM NORTH INLET. INLETS ARE IN CONC CURB.

3. NO SUBSURFACE DRAINAGE.

4. NO SHOULDERS.

DA FORM 5150-R, NOV 82

Figure 6-2. An example of a completed DA Form 515-R, Section Identification Record.

(c) All shoulder information and secondary structure information, including location and number of manholes, catch basins, etc. (Location of these structures is important since they can affect maintenance and/or rehabilitation practices.)

(d) Sample units in the section (Locating sample units will help when verifying inspection results and planning future inspections.)

(e) North arrow.

(2) Information from the form can be used to plan inspections and estimate maintenance or rehabilitation costs. It is essential to note the identification of real property and family housing areas, since the funds used for work in family housing is different.

d. Form 5151-R, Section Pavement Structure Record. This form is designed for recording information concerning the existing structural layers of the pavement. This information is important when evaluating the pavement load-capacity capacity and determining feasible M&R alternatives. This form is divided into four areas: initial construction, overlays, surface treatment, and a heading. A completed form is shown as an example in figure 6-3. Some details concerning completion of this form are given in the paragraphs that follow.

(1) Information referring to the original construction is recorded on the lower area of the form. This information may not always be easily obtained. A little research, however, should provide usable data. If repair work has been performed on the section, the thickness and type of material should be available for recording in the central two sections of the form. The material codes in table 6-1 should be used, when possible.

(2) In the example shown in figure 6-3, the installation name, date, branch name and section is shown in the top area of the form. The next area, used to record data on surface treatment, remains blank because no surface treatments have been performed to date. In the next area data is recorded concerning the asphaltic concrete overlay placed in October 1978. In the area at the bottom of the form, all the information available concerning initial construction is recorded. This includes the silty clay subgrade, the crushed stone base and the asphaltic concrete leveling and surface courses complete with thickness and construction dates.

(3) In the portion of the form providing space for recording overlays or surface treatments, space is provided to record the location of placement if the entire section is not repaired. It is important to note that if an entire section is not overlaid, a new section must be defined. Also, if a section's surface is removed by rotomilling, the overlay should be recorded and the milling noted in the comments portion of the card. The original surface thickness should also be reduced by the appropriate amount.

(4) In the event the surface is heater scarified and recompact, this should be recorded as a surface treatment and noted in the comments portion of the card.

e. DA Form 5152-R, Section Materials Properties Record. This form stores information on the material properties of the pavement section. It should contain any available test data on each pavement layer. (Typical tests for each pavement layer are listed in table 6-2.) This card, in conjunction with the Pavement Structure Card, can be used to evaluate the load-carrying capacity of the section. Also, the material properties information and condition record can provide feedback on the performance of different paving materials. A completed form is shown as an example in figure 6-4.

f. DA Form 5153-R, Section Traffic Record. The Section Traffic Record stores information on the type and volume of traffic using the facility. A method for recording traffic on roads and streets is provided; however, traffic on branches such as parking areas and storage areas are recorded freeform in the space at the bottom of the card. A completed form is shown as an example in figure 6-5. The form is completed as follows:

(1) The installation, name, date, branch name and section number is recorded in the area at the top of the form. In the center area the dates of the surveys are recorded (September 1978 and August 1979 in the example.) The volume index of each type of traffic observed must be determined and recorded. Table 6-3 identifies traffic types and provides the method for determining a volume index. (Note: Traffic type a is passenger vehicles; b is two-axle trucks; c is trucks with three or more axles; d is 60-kip track vehicles; e is 90-kip track vehicles; and f is 120-kip track vehicles.) The volume index for each type of traffic is based on the operations per lane per day for that type of traffic. In the example considered, the following data was taken.

<i>Date</i>	<i>Type of traffic using the pavement section</i>	<i>Volume per lane per day</i>
Sep 78	Passenger, panel, and	
pickups	2500
Sep 78	Two-axle trucks and buses	85
Sep 78	Trucks with three or more	
axles	15
Aug 79	Passenger, panel, and	
pickups	4500
Aug 79	Two-axle trucks and buses	250
Aug 79	Trucks with three or more	
axles	9

Using these data, the volume indices for each traffic type was determined from table 6-3 as follows:

SECTION PAVEMENT STRUCTURE RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Number
FORT Z	10 10 79	MARSHALL STREET	1

Surface Treatment		Material	Material Code	Thickness(in.)	Date Const.	From	Location (If less than entire section)* To
	Surf. Treat. (3)						
	Surf. Treat. (2)						
	Surf. Treat. (1)						

Overlays		Material	Material Code	Thickness(in.)	Date Const.	From	Location (If less than entire section)* To
	Overlay (3)						
	Overlay (2)						
	Overlay (1)	ASPHALT CON. MIX C.	1 2 0	1.5	10/78		

Initial Construction		Material	Material Code	Thickness(in.)	Date Const.	Comments
	Surface	ASPHALT CONC	1 2 0	2.0	6/60	
	Leveling	ASPHALT CONC	1 2 0	2.0	6/60	
	Base	CRUSHED STONE	3 1 1	8.0	5/60	
	Subbase					
	Select					
	Compacted Subgrade	SILTY CLAY	3 4 5	12	5/60	
	Natural Subgrade	SILTY CLAY	3 4 5	-	-	

*New Section of Branch Must Then be Identified
DA FORM 5151-R, NOV 80

Figure 6-3. An example of a completed DA Form 5151-R, Section Pavement Structure Record.

Table 6-1. Material Codes

Material Codes.
100 Surface Materials*

110	Portland Cement Concrete	155	slurry seal
111	plain	156	fog seal
112	reinforced concrete pavements (RCP)	157	asphalt rubber chip
113	continuously reinforced concrete pavement (CRCP)	158	fabric
114	prestressed	159	dust layering
115	fibrous	160	Preformed Joint Fillers
120	Asphalt Concrete	161	bituminous fiber
130	Road Mix Bituminous Surface	162	cork
140	Sand-Asphalt	163	self-expanding cork
141	plant mix	164	self-expanding rubber
142	road mix	165	sponge rubber
		166	closed cell plastic
150	Surface Treatments	170	Joint and Crack Sealers
151	single-layer aggregate seal	171	hot-poured
152	double-layer aggregate seal	172	cold-poured
153	three- or more layer aggregate seal	180	Others
154	sand seal		

200 Treated or Stabilized Materials

210	Cement Treated	240	Asphalt-Treated Plant Mix
211	gravel and crushed stone	241	crushed stone
212	sand	242	gravel
213	silt and clay	243	sand
220	Lime-Flyash Treated	250	Asphalt-Treated Road Mix
221	gravel and crushed stone	251	crushed stone
222	sand	252	gravel
223	slag	253	sand
230	Lime-Treated Fine-Grained Soil	280	Others

300 Untreated Materials

310	Crushed Stone	333	high fines content
311	well-graded		
312	poorly graded (one-sized)	340	Fine-Grained Soils
313	high fines content	341	sandy silt
320	Gravel	342	silt
321	well-graded	343	clayey silt
322	poorly graded	344	sandy clay
323	high fines content	345	silty clay
330	Sand	346	clay
331	well-graded	347	organic silt
332	poorly graded	348	organic clay
		380	Others

*For unpaved roads, refer to treated or untreated materials list for identification purposes.

SECTION MATERIALS PROPERTIES RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Number
FORT Z	10 1 79	MARSHALL AVE	1

[illegible]

DA FORM 5152-R, NOV 80

Figure 6-4. An example of a completed DA Form 5152-R, Section Materials Properties Record.

Table 6-2. Typical Layer Materials Properties

1. Asphalt Concrete (Surface, Leveling, Base):
 Marshall stability (pounds)....Asphalt content (%)
 Flow (0.01 inch) Unit weight
 (pounds/cubic foot)
 Air voids (5) Asphalt penetration
 (millimeters x 10¹)
2. Portland Cement Concrete (PCC):
 Modus of rupture (pounds/square inch)
 Compressive strength (pounds/square inch)
 Entrained air (%).....
 Water/cement ratio (gallon/sack).
3. Base-Subbase Materials:
 k-value (pounds/square inch)
 CBR.....
 In-situ dry density (% of optimum).
 In-situ moisture content.....
4. Subgrade:
 Unified classification Liquid limit
 CBR..... Optimum moisture
 control (%)
 K-value (pounds/square inch).... In-situ moisture content
 (%)
 Plasticity index..... In-situ dry density (% of
 optimum)

(a) The volume of traffic for traffic type a was found on the traffic survey of September 1978 to be 2500. Looking down column a, table 6-3, that value (2000-3999) was located. Looking horizontally to the far right the column identified as "Volume Index" was reached at 5. That value 5 was recorded on the form as the volume index for type a traffic for the survey date 9/78.

(b) The volume of traffic for traffic type b was found on the traffic survey of September 1978 to be 85. Looking down column b, table 6-3, that value (50-199) was located. Looking horizontally to the far right the

Table 6-3. Traffic Volume Index for Roads

TRAFFIC TYPE					
a	b	c	d	e	f
ANNUAL AVERAGE OPERATION PER LANE PER DAY					
NONE	NONE	NONE	NONE	NONE	NONE
LESS THAN 100	LESS THAN 10	LESS THAN 10	LESS THAN 1	LESS THAN 1	LESS THAN 1
100-499	10-49	10-49	1-4	1-4	1-4
500-999	50-199	50-199	5-9	5-9	4-9
1000-1999	200-499	200-499	10-19	10-19	10-19
2000-3999	500-999	500-999	20-49	19-49	20-39
4000-5999	1000-1499	1000-1499	50-99	50-99	40-59
6000-7999	1500-1999	1500-1999	100-199	100-149	60-79
8000-9999	2000-2499	2000-2499	200-399	150-199	80-99
MORE THAN 10,000	MORE THAN 2500	MORE THAN 2500	MORE THAN 400	MORE THAN 200	MORE THAN 100

VOLUME INDEX	0
	1
	2
	3
	4
	5
	6
	7
	8
	9

- a Passenger, panel and pickups.
 b Two-axle trucks and buses; also half-or full-track vehicles less than 20 kip, and fork lift trucks less than 5 kip.
 c Trucks with three or more axles. Also half- or full-track vehicles 20-40 kip, and forklift trucks 5-10 kip.
 d 60-kip track vehicles and/or 15 kip forklifts. Number of operations per lane per day for tracked vehicles 40-60 kip and/or forklift trucks 10-15 kip.
 e 90 kip track vehicles and/or 20 kip forklifts.
 f 120 kip track vehicles and/or 35 kip forklifts.

DATE OF SURVEY	9/1973											
TRAFFIC TYPE	a	b	c	d	e	f	a	b	c	d	e	f
VOLUME INDEX	5	3	2	0	0	0						

"Volume Index" was reached at 3. That value 3 was recorded on the form for type *b* traffic.

(c) The volume of traffic for traffic type *c* was found on the traffic survey to be 15. Looking down column *c*, table 6-3, that value (10-49) was located. Looking horizontally to the far right the "Volume Index" was reached at 2. That value 2 was recorded on the form for type *c* traffic.

(d) The volume of traffic for traffic types *d*, *e*, and *f* was zero. The "Volume Index" was therefore zero and that value was recorded on the form for traffic types *d*, *e*, and *f*.

(e) The volume indices for the traffic survey of August 1979 was determined as indicated above for the 1978 survey. The values determined (*a*=6, *b*=4, *c*=1, *d*=0, *e*=0, *f*=0) were recorded on the form for the survey dated 8/79.

(2) Space is provided at the bottom of Form 5153-R marked "Parking Lots-Airfields-Other." This space should be used for describing the type and volume of traffic using facilities other than roads. For example, if the pavement section being considered is a parking lot, the description of traffic can be, "The dominant type of vehicle using the parking lot is passenger cars, averaging 12 hours per day." This information is used when evaluating the existing pavement section or when designing a new cross-section.

g. DA Form 5154-R, Section Condition Record. The Section Condition Record stores data obtained from the condition survey of the section's sample units and summarizes the distress found in the section.

(1) A completed DA Form 5154-R is shown as an example in figure 6-6. The form is completed as follows:

(a) The installation name, the branch name, the date and the section number is recorded at the top of the form.

(b) The average PCI of the sample units (in the example, 70) is recorded as well as the condition rating (good).

(c) Ratings for ride quality, safety, and drainage are recorded by marking the appropriate space (G for good, F for fair, P for poor). In the example the ratings are good. The ratings on the form are for general information since the PCI accounts for each of these factors through distress types.

(d) The total number of sample units in the section is recorded (in the example, 5).

(e) The number of random units surveyed is recorded. In the example, five units (all the units) were surveyed.

(f) The number of additional units surveyed is recorded (in the example, zero). If the

section is inspected by sampling, the number of random and additional units surveyed is recorded. If all sample units are surveyed, the number is recorded as random units.

(g) The PCI range is computed, by subtracting the lowest sample unit PCI from the highest sample unit PCI, and recorded (in the example, 20).

(h) The minimum number of sample units to be surveyed is determined and recorded (in the example, 5). Determination of minimum number of sample units to be surveyed is described in chapter 3. If the minimum number of sample units required is greater than the number of random units surveyed, more units must be selected at random and surveyed.

(i) The pavement type is determined and recorded. (In the example, AC is marked to indicate asphalt-surfaced pavement. If the pavement had been concrete, PCC would have been marked.)

(j) The section dimensions and area are marked (in the example, 25 feet by 500 feet, 1388 square yards).

(k) The method of determining the section distress data is marked. (In the example, "Actual Quantities" is marked because the entire section was inspected. If inspection by sampling was used the circle next to extrapolated quantities should be marked.

(l) Once it has been determined that a sufficient number of sample units have been surveyed, the section distress data portion of the form can be completed. If actual quantities are used (i.e., the entire section inspected), the section's values are found by totaling the quantity of each distress type and severity level. The section density and deduct values are then computed as normally done for a sample unit (See para 3-5d(1) for asphalt pavements and para 3-5d(2) for concrete pavements). (In the example the distress portion of the form has been completed starting with Distress Type 1, Severity Level L, Quantity 30, Section Density .24 and Deduct Value 4.)

(m) The deduct values are totaled (in the example, 47).

(n) On the last line of the form the percent deducts related to structural, environmental, or other conditions is marked (in the example, 75 percent structural, 25 percent other).

(2) The completed Section Condition Record with distress information can be used to evaluate M&R requirements and to provide quantities of repair for cost estimates. It is very important to note that the deduct

SECTION TRAFFIC RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Number
FORT 2	10 1 59	MARSHALL AVE.	1

Roads or Streets																									
Date of Survey	9/58						8/59																		
Traffic Type	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	
Volume Index	5	3	2	0	0	0	6	4	1	0	0	0													

Parking Lots - Airfields - Other	
Date of Survey	Description

DA FORM 5153-R, NOV 82

Figure 6-5. An example of a completed DA Form 5153-R, Section Traffic Record.

values determined from these data *cannot be used* to complete the PCI of the section.

(3) The percent of deducts relating to structural, environmental, or other conditions are used when performing the section evaluation described in chapter 4.

SECTION CONDITION RECORD

For use of this form, see TM 5-623, the proponent agency is USACE.

Installation Name	Branch Name	Date	Section Number
FORT Z	MARSHALL AVENUE	10 1 79	1

Average PCI 70 Condition Rating GOOD

Ride Quality G X F P Safety G X F P Drainage G X F P

Total No. of Sample Units 5 No. of Random Units Surveyed 5

No. of Additional Units Surveyed 0

PCI Range 20 Minimum of Units to be Surveyed 5

Pavement Type ☒ AC ☐ PCC Section Area 25 ft. x 50.0 ft. 1388 sq. yd. Section Distress Data ☐ Extrapolated Quantities ☒ Actual Quantities

Distress Type	Severity Level	Quantity	Section Density	Deduct Value	Comments
1	L	30	.24	4	RUTS OCCUR IN CONJUNCTION WITH MEDIUM ALLIGATOR CRACKS (1M).
1	M	80	.64	17	
7	M	300	2.4	12	
15	L	80	.64	14	
Total				47	

Percent Deducts Structural Related 75 Environmental Other 25

DA FORM 5154-R, NOV 82

Figure 6-6. An example of a completed DA Form 5154-R, Section Condition Record.

h. DA Form 5155-R, Branch Maintenance and Repair Requirements. This form stores information on required M&R activities; it is completed by using information previously recorded on DA Forms 5150-R through 5154-R. A form should be completed for each branch of the pavement network. For a detailed explanation of how to determine M&R requirements, see chapter 4.

(1) A completed DA Form 5155-R is shown as an example in figure 6-7. The form was completed as follows:

(a) The installation name, date, branch name and total number of sections in the branch was recorded at the top of the form. (In the example there are 6 sections in the branch.)

(b) All branch maintenance and repair work required was listed. The section number where the work was needed was recorded. The work item was described. The work class was recorded (*M* for maintenance, rather than *R* for repair, or *C* for new construction). The location of the proposed work (*R* for roadway, rather than *PL* for parking lot, *A* for airfield, or *O* for other) was recorded. The thickness of the proposed work was recorded. The quantity of the work item was recorded. The estimated cost of the work item was recorded. The priority that the work item rated was recorded. A final column provides space for recording the date the work item is completed.

(c) The lower area of the form is for remarks. An appropriate comment was recorded.

(2) The information on the Branch M&R Requirements form may change frequently. For example, when a work item is completed, other priorities may change. So the date of completion of the work item must be recorded and priorities updated at that time.

(3) Since the information on the Branch M&R Requirements form(s) changes frequently, a new form should be made when necessary. Information on completed M&R activities should always be transferred to a DA Form 5156-R, Section Maintenance and Repair Record, as a permanent record.

I. DA Form 5156-R, Section Maintenance and Repair Record. This form stores information on maintenance and repairs that have been completed. It can be compiled from data from DA Form 5155-R and as-built records. A separate form is used for each section; this allows the expenditures for maintenance of each section to be monitored. This type of information may be valuable when determining M&R requirements or when performing economic analyses on other sections. The information on DA Form 5156-R is very

similar to that kept on DA Form 5155-R, except that the completion date of M&R is listed for *each* activity and the cost should be the *actual* cost of M&R rather than an estimate. A completed DA Form 5156-R is shown as an example in figure 6-8. The form was completed similar to DA Form 5155-R. The actual rather than the proposed thickness, quantity and cost were recorded.

6-4. Manual record keeping system-general

The manual record keeping system consists primarily of the nine forms described in paragraph 6-3. Those forms are used for information storage. To use data efficiently, this information must be stored in an orderly fashion. Figure 6-9 is an example of such a system; it can be described as follows:

a. Branch summary. One folder stores the network inventory. This is the information recorded on DA Form 5149-R, Branch Identification Summary.

b. Branch identification information. One folder stores branch identification information. This folder serves as a heading card and as the storage slot for DA Form 5155-R, M&R Requirements. (This allows anticipated maintenance activities for each section of the branch to be stored in one location.) The branch identification forms should be filed in the order shown on the DA Forms 5149-R, Branch Identification Summary.

c. Branch sections. After the Branch Identification Summary forms, a series of file folders should be provided for each section of the branch. One folder each is provided for DA Forms 5149-1-R, 5150-R, 5151-R, 5152-R, 5153-R, and 5154-R. (These forms contain basic information on the section.)

d. Inspection forms. Field survey data on the sample unit inspection sheets should be retained. This information is included on the DA Form 5154-R, Section Condition Record (fig 6-6); however, the inspection sheets can help verify data, and would be essential if the installation wanted to convert from the manual PAVER system to a computerized PAVER system.

6-5. Record upkeep

Once the initial division of the pavement network into branches and sections has been completed, the filing system can be started. As the initial inspections take place, the information on DA Forms 5149-1-R through 5153-R can be compiled. As branches are completed, data analyses can begin (chap 4).

a. Updating forms. Forms must be updated once maintenance activities begin. If overlays or surface treatments are applied, the DA Form 5151-R, Section

BRANCH MAINTENANCE & REPAIR REQUIREMENTS

For use of this form, see TM 5-623; the proponent agency is USACE.

PAGE 1 OF 1

Installation Name	Date	Branch Name	Total No. of Sections
FORT E	10/1/79	MARSHALL AVE	1

Work Class : M = Maintenance R = Repair C = New Construction Location : R = Roadway PL = Parking Lot A = Airfield O = Other

Section No.	Work Description	Work Class	Loc.	Thickness, inches	Quantity/Unit	Est. Cost	Priority	Date Completed, M/Y
I	* DEEP PATCH MED. ALLIG. CRACKS	M	R	6	10 SQ. YD.	\$100.00	1	
II	CRACK FILL MED. EDGE CRACKS	M	R	-	300 LIN. FT.	450.00	2	

Remarks	* PATCHING OF MED. ALLIGATOR CRACKS WILL ELIMINATE EXISTING RUTS.

DA FORM 5155-R, NOV 82

Figure 6-7. An example of a completed DA Form 5155-R, Branch Maintenance and Repair Requirements.

SECTION MAINTENANCE AND REPAIR RECORDPAGE 1 of 1

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date			Branch Name	Section Number
FORT Z	Mo. 11	Da. 1	Yr. 79	MARSHALL AVE	1

Work Performed					
Date of M&R	Description of Work	Location	Thickness	Quantity/Unit	Cost
10/20/79	DEEP PATCHES	WHEEL PATHS SAMPLE UNITS 1,3,4,5	6 INS.	15 SQ YDS.	\$150.00
10/22/79	CRACK FILLING	EDGES SAMPLE UNITS 1-3	-	300 LIN. FT.	400.00

Remarks: _____

DA FORM 5156-R, NOV 82

Figure 6-8. An example of a completed DA Form 5156-R, Section Maintenance & Repair Record.

Pavement Structure Record Card, must be updated. Also, as work is completed, information from the DA Form 5155-R, Branch M&R Requirements, must be transferred to the DA Form 5156R, Section M&R Record. Performance of maintenance activities will also change the condition of the section; thus, the condition survey should also be updated.

b. Updating of condition survey. If a section receives no maintenance, the condition survey should be updated based on the rate of deterioration. Initially, this rate can be estimated by briefly inspecting the section to observe changes in distress types or

severity's. Until data are compiled, sections should be reviewed at least annually to observe this change in condition. Once the rate of deterioration is determined, sections with low rates may be inspected at more infrequent intervals. If the filing system is updated continuously as work is performed and inspections are completed, it should not be necessary for the pavement engineer to perform a condition survey of the entire system all at one time.

c. Economic analysis. Any economic analysis performed to determine M&R strategies for given sections should also be filed with the section information cards.

Following each branch folder are the folders for each section of the branch. DA Forms 5149-1-R, 5150-R, 5151-R, 5152-R, 5153-R, and 5154-R are kept in these folders.

Branch Identification Folder--
One is provided for each branch. DA Form 5155-R, Branch Maintenance and Repair Requirements, is stored here.

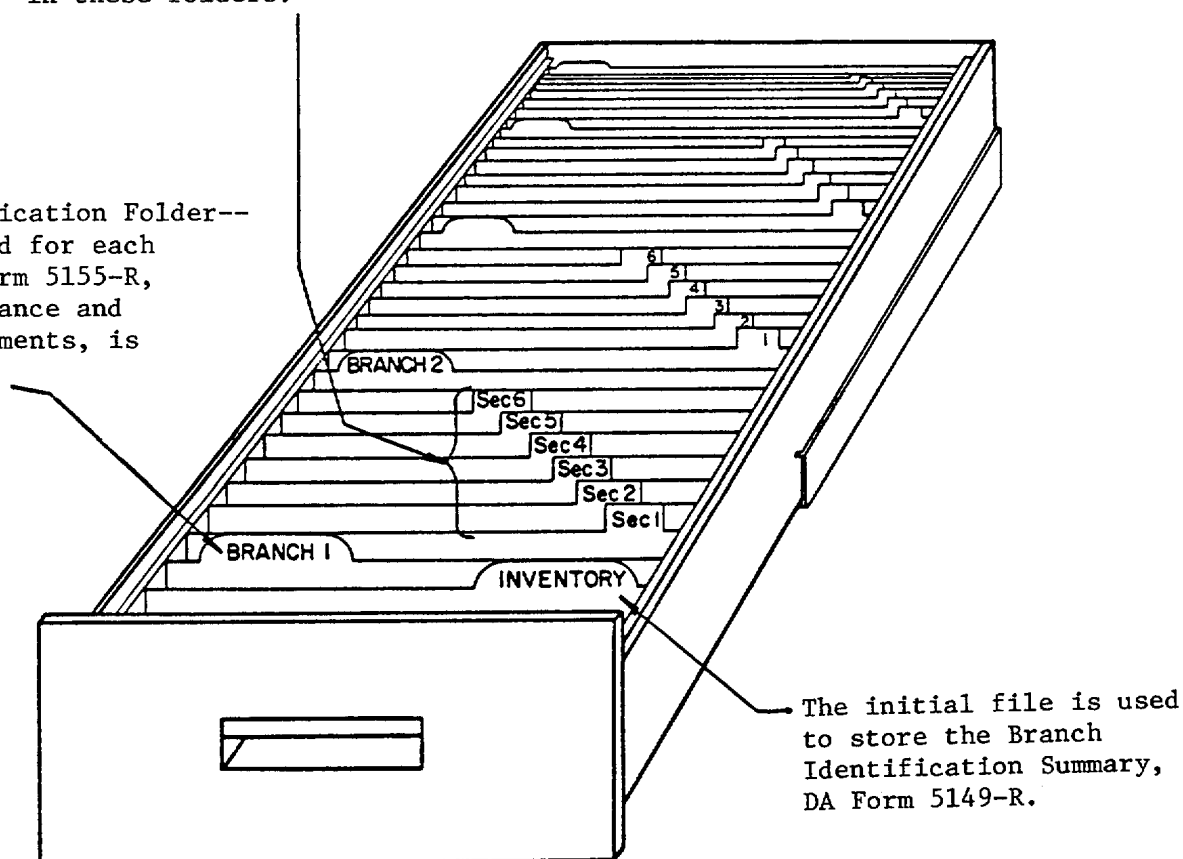


Figure 6-9. Example of a filing sequence for a manual record keeping system.